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*Graptopetalum amethystinum*, grown by Secy. J. S. Denny. Photographed by Mr. J. R. Brown (From "Succulents for the Amateur").



## CACTUS AND SUCCULENT JOURNAL

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One of Mr. J. R. Brown's 200 photos from "Succulents for the Amateur." *Graptopetalum paraguayense*, formerly known as *Echeveria Weinbergii* and *Byrnesia Weinbergii*.

### ANNOUNCING "SUCCULENTS FOR THE AMATEUR"

The long-promised Succulent book is now a reality and will be ready for delivery the first week in August. The many friends of "Cacti for the Amateur" have demanded this inexpensive companion book, and it is submitted with confidence that it will supply the need for a beginners' book.

All credit is due to those who generously contributed to this book—Mr. Alain White and Mr. Boyd L. Sloane for their chapters on Stapelias and Euphorbias, Mr. G. W. Reynolds for his work on Aloes, and Mr. J. R. Brown who contributed hundreds of excellent photographs along with his many years of experience in growing these succulents. Mr. Brown has figuratively taken a trip to South Africa, selected the finest plants, and then grown them just as near to the habitat conditions as is possible. His photographs tell the story with explanations that are understandable and devoid of any technicalities.

Having explained general culture in "Cacti for the Amateur," we have devoted this new book to naming succulents in beginners' collections. Sufficient habitat information is given for each group so that the novice will have no difficulty with their culture.

Containing 32 more pages and double the number of illustrations of "Cacti for the Amateur," this new

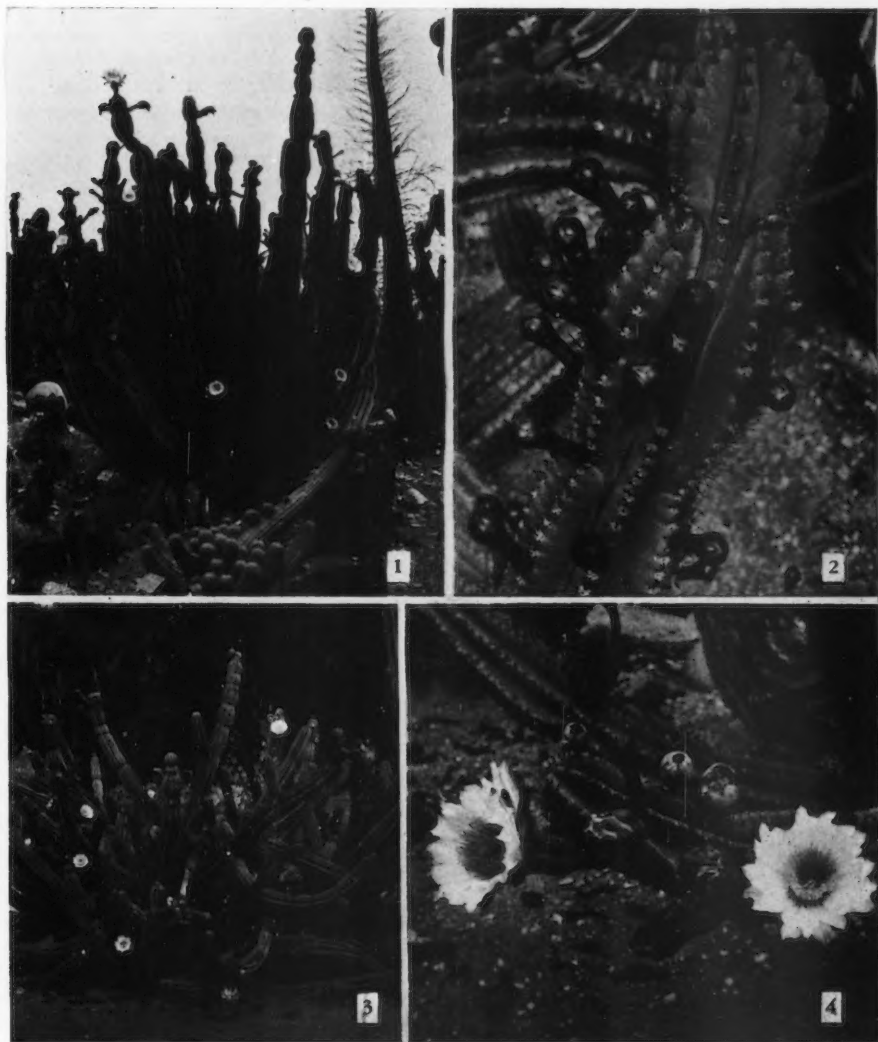
book shows over 370 different succulents, including a plate of 80 plants in color. There are eight additional color plates showing colorful plantings.

If you have reserved a copy please confirm whether you desire the paper bound edition at \$1.50 or cloth bound at \$2.00. Postage 5c; foreign 15c. Please add sales tax in Calif. Orders will be filled in rotation as received and cash with order will speed deliveries and help us as we endeavor to give you an especially good book at an especially low price—another Abbey Press book.

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### LAST NOTICE FOR BINDING JOURNALS

Some of our members overlooked the notice in last month's JOURNAL. We are extending the closing date to July 20. No JOURNAL will be bound after that date. Assemble your 12 issues and send them by Express or Parcel-Post (not first class) to Cactus Society. Back volumes of the JOURNAL may be bound at this time. Please send \$1.50 for each volume and 25c for each missing copy. Be sure to add the same amount that it costs to send your JOURNALS (postage or express) for the return of your bound copies. Retain the sections of the Glossary. California orders must add 5c Sales Tax. 136 West Union St., Pasadena, Calif.



1. *Cereus peruvianus*—upright type. 2. Close-up of buds and young growth. 3. Spreading type.  
4. Close-up of flowers, buds and fruit.

## CEREUS PERUVIANUS {Linn.} Miller

By WILLIAM HERTRICH, Curator Huntington Botanical Gardens

There is much confusion in regard to *Cereus peruvianus* (L.) Miller, one of the most widely distributed and greatly admired members of the *Pleurostachya*; and this applies not only to its varieties but also to its distinct monstrose form.

This misunderstanding has arisen mainly because a great many chance seedlings of this species, as well as of closely related species and varieties, have been widely disseminated through various channels. This has resulted in bewildering col-

lectors generally in trying to determine which of the many types offered is the species and which is the monstrose form. In order to clarify this rather involved situation, it is first of all essential that only varieties of sufficient distinction and merit be recognized and recorded. Established varieties should have definite characteristics in either flower, fruit, spine arrangement, habit of growth, or a combination of several of these differences. Since I have observed a great many varieties, over a period of years, not only in the Huntington Botanical Gardens, but in other collections in southern California and elsewhere, I hope to clear up some of the confusion surrounding this widely distributed species and some of its forms and varieties.

Dr. Erich Werdermann, the well-known authority on cacti, was invited to study the material of the genus *Cereus* in the Huntington Botanical Gardens during the summer of 1933. He published some of the results of his investigations in *Notizblatt des Bot. Gart. u. Mus. Berlin-Dahlem* Bd. XII, Nr. 114, and Bd. XIII, Nr. 118, entitled "Neue und Kritische Cactaceae aus dem Huntington Botanic Garden in California."

However, since that time I have been able to collect additional data on the flowering and fruiting of many species and varieties, including *Cereus peruvianus* and its varieties. I should like to add some of this data to the previously published material with the hope that it might be of help in selecting desirable and freely flowering types.

Dr. Werdermann pointed out that *Cereus peruvianus* (L.) Miller was one of the earliest known members of the Cactus family, for the name "peruviana" was used by Bauhin in 1623. It is, however, rather difficult to give all of the type characteristics of this species as type material is not available and, furthermore, its type locality is unknown. The species and its monstrose form have been under cultivation for many years in tropical and sub-tropical countries. Early authors have associated other species with *Cereus peruvianus*. The monstrose form of this species is quite distinct, yet one often finds such similar forms as *Cereus Beysiegelii* Rettig., *C. horribarbis* Otto, and even *C. Milesimus* Rost, confused with *Cereus peruvianus* f. *monstrosus* DC. All of these species have been cultivated in the Huntington Botanical Gardens for many years and have been given the same cultural treatment, grown under the same soil conditions and planted under similar exposures. They have attained practically mature proportions, have flowered freely, and have set fruit abundantly. Observations of these plants clearly demonstrate

that there is absolutely no difficulty in distinguishing *C. peruvianus* and its monstrose form, from any of the above mentioned species. Nor is there any difficulty in disassociating *Cereus peruvianus* itself from its well known monstrose form and described varieties.

Dr. Werdermann studied the early descriptions of this species and satisfied himself that his analysis agreed with the excellent illustrations found in De Candolle's *Revue de la Famille des Cactees* Paris, 1829, Tom. XVII, Plate II, as well as with the description given by Arechavaleta in his *Flora Uruguay* 511 X. 255 ff., who was particularly interested in *Cereus peruvianus*, and pointed out the characteristic shape of its flower.

It might be supposed from the specific name that this species is native to Peru. This is, however, most unlikely as there is no record that any *Piptanthocereus* has ever been found indigenous to the western slopes of the Andes. It is more probable that Uruguay is its native habitat, inasmuch as the plant is found growing in great quantities there, particularly in the neighborhood of Montevideo.

The flowers and fruit of the "Peruvianus group" are quite characteristic in most cases for they have the following readily distinguishable features: flowers, especially of the species, are among the shortest of the *Piptanthocereus*; the tube is generally heavily corrugated; and the perianth segments are set at right angles to the tube when the flower is fully open. In one of the described varieties, pistils protrude from the flower buds several weeks before the flowers open. By comparison with other species of the genus *Cereus*, the fruit is small, almost globose but somewhat flattened at the poles (the one conspicuous exception to this general description is found in *Cereus peruvianus* var. *ovicarpus* var. nov. in allusion to its egg-shaped fruit) its color ranges from greenish-yellow to orange-yellow. The skin is rather thick, unevenly corrugated (with the exception of var. *ovaticarpus* again whose fruit is smooth) and splits across the blossom end when ripe.

However, it should be made clear before proceeding to the formal descriptions of *Cereus peruvianus* and its varieties that these plants, as well as practically all members of the *Piptanthocereus* group, probably attain greater proportions and grow somewhat faster under more tropical conditions than are found in southern California. Therefore, the dimensions attained at the ages given for some of the species and varieties to follow, apply to plants grown under subtropical conditions as found in southern California.

**Cereus peruvianus (L.) Miller**

(Plants No. 44 - 7 and No. 5 - 89, H. B. G.)

**Habit of growth:** Varies somewhat, the upright type is rather compact, branching densely beginning at or near the base (Fig. 1). Measurements of this plant taken on January, 1939, showed the height to be nearly 3 m., and its greatest spread slightly over 3 m. tapering to less than half that width at the base. The second type also branches from the base but has a considerably more open, and spreading habit of growth (Fig. 3). This type measures less than 3 m. in height but has a spread of over 5 m. Color of new growth, light green, changing to bluish gray in the second season; mature growth is light grayish green. Branches range in thickness from about 10 cm. in young growth to twice that dimension in mature limbs.

**Ribs:** Rather flat and varying from 6 - 8 in number, averaging 7; from 20 - 25 mm. high in young growth, very rarely 50 mm. Nearly 10 mm. thick along the ridge but almost twice that at the base. Ridges are rather jagged in young growth but in mature growth they bulge slightly outward between the areoles. Transverse lines along the sides of the ribs begin just above the areoles and extend half-way towards the base.

**Terminals:** In young growth, covered with brownish felt, intermixed with longer, lighter colored, fluffy strands; some loosely arranged spines protrude out of the felt cushion usually straw-colored but occasionally reddish-brown.

**Areoles:** Slightly recessed, about 20 mm. apart in young growth, somewhat more in mature. Nearly round about 6 by 7 mm. in diameter. Young areoles covered with brown felt, turning light gray when more mature and finally becoming very dark gray on old limbs.

**Spine arrangement:** Rather variable in young growth; 3 spines are often found in the lower half of the areole ranging from 3 - 15 mm. in length, while in the upper portion there are only 1 or 2, and so short that they barely protrude beyond the felt cushion. Usually, one central spine which varies in length in the different areoles. Variations in the spine arrangement occur quite frequently even on the same plant. In some areoles, none of the spines exceed more than a few mm. in length. All spines are straight, acicular, varying somewhat in thickness, all are slightly heavier at the base. In areoles of old limbs, the spine arrangement is fairly regular. They form a

half circle usually of from 4 - 5 spines in the lower portion of the areole, generally 20 mm. long. One central spine, often 50 mm. long, is set either at right angles to the areole, or slants downward slightly.

**Radial spines:** From 4 - 6 on older areoles, the longest ones slant downward, 2 usually extend sideways and measure 15 mm. in length. Quite often there are 1 or 2 shorter, more upright spines in the upper portion of the areole.

**Central spine:** Usually one, occasionally 20 mm. long, pointing forward at a slight angle.

**Flowers:** Up to 16 cm. long, slightly fragrant, and, as are all *Piptanthocereus*, nocturnal.

**Ovary:** 20 mm. long by 16 mm. in transverse diameter, shiny, light green. Surface is usually uneven, but occasionally smooth with a few, scattered, yellowish bracts ending in a fine point.

**Tube:** Light green, from 70 - 75 mm. long; strongly corrugated near the top. Occasionally a few, small bracts are set at a slant along the tube.

**Outside perianth segments:** Up to 50 mm. long by 10 mm. wide, with a broadly rounded apex; dark green at base fading into yellowish-white above, balance reddish-brown, margins smooth.

**Inside perianth segments:** Slightly longer than the outside; reach a length of 55 mm. and 15 mm. in width in the upper third; white, margins slightly serrated. Total number of perianth segments average 40, as per count of many flowers.

**Stamens:** 35 - 40 mm. long, attached to the walls of the tube, beginning about 35 mm. above the ovary, thus forming a nectar cavity about 35 mm. long.

**Anthers:** Dull, yellowish-brown.

**Style:** (a) *Column:* 15 cm. long, smooth at base but less so above. (b) *Stigma lobes:* 14; from 16 mm. - 18 mm. long, yellowish-green, extending even with the anthers as a rule, but sometimes exserted. A total of 823 flowers was produced on plant No. 5 - 89, H. B. G. (the spreading type) from May 18 to July 27, 1938.

**Fruit:** Follows the characteristic pattern, but is more oblate than globular, up to 65 mm. from stem to blossom end; about 70 mm. in transverse diameter. Average size smaller. Skin 6 mm. thick, unevenly corrugated and partly tubercled. Light yellow, occasionally turning orange-yellow when fully mature; inside color yellowish-white. Pulp, white. Fruit splits across the blossom end when ripe.



*Seeds:* Flat, kidney shaped, about 2 mm. long.

Hilum end on a slant; opposite end, pitted.

About 1.2 mm. broad, dull black.

Small specimens of both types of *Cereus peruvianus* were planted in their respective locations twenty-five years ago.

*Cereus peruvianus*

forma *monstrosus* De Candolle

(Plant No. 5 - 232, H. B. G.)

*Habit of growth:* Branches uniformly, at or near the base, in all directions. Some of the limbs, when touching the ground, take root



5. Type plant of *Cereus peruvianus* var. *persicinus*. 6. Type plant of *Cereus peruvianus* var. *reclinatus*. (A four-foot *Echinocactus grusonii* in the foreground.)

and form new plants. Six of the largest specimens cultivated at the Huntington Botanical Gardens were set out as small plants in 1910, 1911 and 1912. The largest of these measures at this time 2.75 m. in height (9 feet) while it has a spread of 5.5 m. (18 feet). Five other specimens are slightly smaller but the proportions of their spread to height is about the same.

**Color:** Light green in young growth, fading into grayish-green when mature; very old branches become gray and scaly.

**Size:** Thickness of the limbs in the monstrose form averages about the same as in *peruvianus*. Some of the oldest of the main branches have attained a thickness of 28 cm.

**Terminals:** In new growth, are covered with yellowish brown spines protruding from a grayish-brown felt cushion, changing to dark gray in age.

**Ribs:** More numerous in the monstrose form than in the type. Often 12 in new growth, ranging from 15 mm. - 20 mm. and later attaining a height of 30 mm. or slightly more. No transverse lines are noticeable along the sides of the ribs. Ridges are generally rounded and curved inward very deeply between the areoles, often down to the base, thus dividing the ribs into large, irregularly shaped tubercles which are often flattened. Thickness of ribs in young growth from 7 - 9 mm., hardly any difference between top and bottom. In older growth, about 15 mm. thick at ridge and 20 mm. or slightly more at base.

**Areoles:** Nearly round, 4 - 6 mm. in diameter, covered with short felt, varying from light to dark gray according to the maturity of growth. Distance between areoles irregular, from 10 - 40 mm. in young growth and from 20 - 40 mm. in old.

**Spines:** At first 5 radial spines and 1 central; quite often 1 or 2 additional center spines appear later. Straw-colored in young growth, changing to a brownish color in age, but retaining lighter points. In old limbs, all spines assume a dark gray color and all are slender, acicular, ranging from 8 - 14 mm. on the oldest branches; some spines reach a length of 20 mm.

**Flower:** When closed, measures about 15 cm. long. Between May 18 and July 27, 1938, 565 flowers were produced.

**Ovary:** About 17 mm. by 20 mm. in transverse diameter. Depressions indicate division between ovary and tube. Surface strongly corrugated, shiny green, bluish hue in the grooves. Numerous small, rounded, yellowish

bracts about 1 mm. wide are present.

**Tube:** About 70 mm. long, corrugated, shiny green with bluish hue in the grooves. Bracts are uniformly spaced in the upper part, obtuse at apex.

**Outside perianth segments:** Nearly 60 mm. long by 15 mm. wide, acuminate; green at base and light reddish-brown at the apex; margins smooth.

**Inside perianth segments:** 6 - 65 mm. long by 18 mm. wide in the lower third, tapering to a point. Upper margins serrated, a few fringes on the apex from 1 - 2 mm. long. As a rule, white with a pinkish tinge along the under side of the apex.

**Stamens:** Attached to the tube beginning about 30 mm. above the ovary. Pale green at base, white above. Nectar cavity 30 mm. long.

**Antbers:** Yellowish.

**Style:** (a) *Column:* 85 mm. long, green at base, fading into yellowish green above.

(b) *Stigma lobes:* 15; about 15 mm. long, extending even with the longest filaments.

**Fruit:** Similar in shape, size and color to the type. Surface more ribbed and tubercled with exceptionally deep grooves at blossom end. Few small bracts (often mere indications) are found in shallow depressions. Skin about 6 mm. thick, outside color penetrates completely. Pulp white and firm.

As previously mentioned, the monstrose form of *Cereus peruvianus* is frequently confused with other *Piptanthocerei*. The following comments giving the obvious differences are, therefore, especially significant.

*Cereus Beysiegelii* Rettig., attains only half the height of *forma monstrosa* and its body and limbs are proportionately smaller; young growth is light green, turning later into bluish-green, finally old growth is grayish-green. Ribs are fewer and fruit is more ovate.

*Cereus horribarbis* Otto, on the other hand, attains more than twice the height of the monstrose form. It forms a definite short trunk and its limbs are heavier while its ribs are considerably heavier and higher. Spine arrangement differs also in certain respects. Color of new growth is blue. Flowers are also larger, and the fruit from two to three times as large, and of a reddish color.

*Cereus Milesimus* Rost, also differs from the monstrose form in the following respects: first, in its upright habit of growth as well as in its greater height; ribs are more numerous and higher; spines are longer and the new growth is blue; flowers are longer and shaded with dark pink; fruit is often cone-shaped, about twice as large, and rosy red.

**Cereus peruvianus**  
var. *proferrens* Werdermann

(Plant No. 5 - 67, H. B. G.)

This variety, apparently an off-spring of the upright type of *Cereus Peruvianus*, attains greater proportions. One plant in the Huntington Botanical Gardens (Fig. 3) has reached a height of 3.5 m. and a spread of nearly 3 m., tapering to less than half that at the base. It was planted in its present location, as a small plant, twenty-five years ago.

**Habit of growth:** Branches densely at, or near the base. Heaviest limbs up to 25 cm. thick and graduate down to about 7 cm. in young growth. Color of plant, a light grayish-green, somewhat paler in young growth, becoming scaly in old.

**Ribs:** Usually 8, but occasionally below or above that number. Height in new growth from 15 - 20 mm., average thickness at base about 20 mm. Ribs on mature limbs are double the dimensions given for the young growth, but somewhat less at the ridge. Broad transverse lines, sometimes slightly indented, are frequently seen beginning above the areole and extending part way down. Ridges are somewhat rounded, slightly crenate.

**Terminals:** Covered with dark grayish-brown felt, overtopped by short, brownish-black spines.

**Spines:** In new growth, range from 3 - 5 radials and usually 1 central spine set at an upward angle. Spines are generally 1 cm. long, the shortest one in the upper part of the areole; all are stout, acicular, and dark brown. In older growth, spines are more uniform, 4 - 5 radials in the lower half of the areole and 1 central spine, set at an upward angle, about 15 mm. long. Radial spines located on the sides of the areole are the longest, i.e., about 10 mm. Quite often, on very old limbs, spines disappear entirely.

**Areoles:** Comparatively small, about 8 by 6 mm., and from 10 - 20 mm. apart, covered with dark gray felt.

**Flowers:** Characteristic feature of this variety is that the stigma lobes project very noticeably beyond the flower buds often several weeks before they open. Length of flower with perianth segments closed, about 15 cm.; when open, flower has a spread of about 10 cm.

**Ovary:** Almost globular, outside dimensions 15 by 16 mm., somewhat ridged, shiny green, bluish hue in depressions; few, small bracts.

**Tube:** About 75 mm. long, slightly ridged, shiny, olive-green, bluish hue in the grooves. Bracts generally located along the upper part,

the largest is 50 mm. long by 17 mm. wide; light green at base, reddish-brown above, hardly pointed.

**Outside perianth segments:** 60 - 65 mm. long by 14 mm. wide. White at base, reddish-brown above. Rounded apex, margins smooth.

**Inside perianth segments:** Up to 70 mm. long by 16 mm. wide; white with pinkish tinge at the point. Margins fringed, ending in a fringed point which extends 2 - 3 mm. beyond the margins. Total number of perianth segments averages about 42. Color of throat greenish-white.

**Filaments:** Attached to the upper part of the tube beginning 35 mm. above the ovary. Base green; top white. Nectar cavity 35 mm. long.

**Anthers:** Grayish-yellow to brownish.

**Style:** (a) *Column:* About 11 cm. long, greenish. (b) *Stigma lobes:* 13; up to 15 mm. long, yellow. Usually even with the filaments but occasionally exserted.

**Fruit:** Somewhat smaller than the type; reaches 30 mm. between stem and blossom end, and about 40 mm. in transverse diameter. In conformity to type it is nearly globular, flattened at both ends. Skin is from 5 - 6 mm. thick, fairly smooth, occasionally corrugated; at times even tubercled. Minute scales located above slight depressions. Dull yellowish-orange against an underlying background of green, with minute dots in a lighter shade.

**Seeds:** Black, kidney shaped, slightly pitted, 2 mm. long by 1 mm. wide.

**Cereus peruvianus**  
var. *persicinus* Werdermann

(Plant No. 9 - 7, H. B. G.)

**Habit of growth:** In contrast to *C. peruvianus* var. *proferrens* Werd., this variety is of an entirely different habit of growth, for its branches extend horizontally from the base in all directions. Its spread, at base, is usually greater than its height. The largest specimen in the garden (No. 9 - 7) has a spread at the time of writing, of at least 8 m. (26 feet), a height of 4.5 m. (15 feet), and is very densely branched. Color of growth dull, grayish-green with green predominating to a greater degree than in any other member of the *peruvianus* group. New growth is of a lighter shade. Cross section of branches measures 7 cm. in new growth and 25 cm. on old limbs.

**Terminal:** Covered with dark brown felt, intermixed with soft, loose, curly, hair-like threads. Reddish-brown spines protrude from the felt cushion.

**Ribs:** Somewhat flat, sharp grooves between them; from 20 - 25 mm. high, and from 10 -



15 mm. thick at base, but only half that dimension at ridge. In mature limbs, size is often double that given here. Ridges bulge outward uniformly between areoles.

*Areoles:* 7 by 5 mm. in size; somewhat recessed and covered with grayish-brown felt. From 15 - 20 mm. apart.

*Spine arrangement:* Fairly regular; usually 4



7. Flowers and fruit of *Cereus peruvianus* var. *persicinus*.

8. *Cereus peruvianus* var. *proferrens* showing stigma lobes extending out of the flower buds.

9. *Cereus peruvianus* var. *reclinatus* showing young and mature growth.

10. *Cereus peruvianus* f. *monstrosa*.

radial spines, occasionally 3 but very seldom 5. These vary from 5 - 15 mm. in length. Only one central spine generally set at an upward angle, about 15 mm. long, or sometimes a little more. On old limbs, spines are occasionally double the length given. In new growth, spines are almost black but when mature become a dark gray. All spines are stiff, needle-like, and bulbous at the base.

**Flowers:** Differ materially in shape from those of the species and are, furthermore, the most colorful of any in the *peruvianus* group. This variety excels in flower production, not only in its own group, but it is safe to say, in the entire genus.

A record was kept of the flowers produced during the summer of 1938 on plant No. 9 - 7. This plant began to flower May 12, 1938, and its flowering season can be divided into three periods. The first, from May 12 to, and including, July 11; the second period from July 12 to August 17; and the third, or final period started August 22 and continued until October 9 when the flowering period finally ended. 987 flowers were produced during the first period. The daily number of flowers produced during the two subsequent periods is as follows:

July 12	—	9 flowers (3rd period)		
13	—	14	Aug. 22	— 4 flowers
14	—	10	23	— 6
15	—	15	24	— 9
16	—	19	25	— 14
17	—	38	26	— 11
18	—	56	27	— 23
19	—	64	28	— 21
20	—	98	29	— 34
21	—	49	30	— 29
22	—	64	31	— 27
23	—	63	Sept. 1	— 24
24	—	43	2	— 19
25	—	76	3	— 9
26	—	47	4	— 9
27	—	34	5	— 11
28	—	41	6	— 10
29	—	36	7	— 23
30	—	34	8	— 21
31	—	38	9	— 32
Aug. 1	—	82	10	— 57
2	—	115	11	— 69
3	—	122	12	— 94
4	—	56	13	— 89
5	—	76	14	— 97
6	—	53	15	— 83
7	—	51	16	— 63
8	—	42	17	— 65
9	—	58	18	— 34
10	—	39	19	— 26
11	—	47	20	— 12
12	—	19	21	— 10
13	—	27	22	— 6
14	—	19	23	— 8
15	—	11	24	— 4
16	—	5	25	— 5
17	—	3	26	— 24
18-21	—	0	27	— 67

Sept. 28	—	59 flowers	Oct. 4	—	71 flowers
29	—	74	5	—	50
30	—	167	6	—	48
Oct. 1	—	194	7	—	31
2	—	186	8	—	18
3	—	161	9	—	6
TOTAL — 4,874					

Total number of fruit produced on the same plant, as per count of August 12, was 1,156. The proportion of fruit to the number of flowers produced during the later period, Aug. 13 - Oct. 20, was slightly greater and amounted to practically 50% of the total number of flowers produced during that period.

**Flower:** Length over all 20 cm., 15 cm. across the top when open. Buds are more slender than the type.

**Ovary:** About 18 mm. long by 17 mm. in transverse diameter, shiny and quite often only slightly corrugated. A few, small, skin-colored or brownish bracts, about 2 mm. wide at base, are scattered over the surface, shading into dark green towards the middle and finally turning to reddish-brown above, with lighter colored margins.

**Tube:** Slightly grooved, shiny green. Bracts with reddish-brown points are appressed except for the point. Uppermost ones are larger, light green at base, shading into dark green towards the middle; reddish-brown apex and lighter colored margins. Throat greenish-white.

**Outside perianth segments:** Up to 80 mm. long by about 14 mm. wide; white at base, light rose above with brownish tinge along the margins.

**Inside perianth segments:** From 80 - 90 mm. long by 15 mm. wide; white, shading into reddish-pink in the upper portion; margins fringed.

Perianth segments average about 40.

**Stamens:** Attached to the upper part of the tube beginning 40 mm. above the ovary; pale green at base, white above. Nectar cavity 40 mm. long.

**Anthers:** Brownish-yellow.

**Style:** (a) *Column:* Pale green; about 13 cm. long. (b) *Stigma lobes:* 16; 20 mm. long, slightly exserted.

**Fruit:** Typical but smaller than the species, and also smaller than var. *reclinatus*. However, it should be remembered that in general the size of the fruit of most *Cerei* is somewhat governed by the number on each limb. Average size up to 45 mm. by 40 mm. from stem to blossom end. True to type, in shape, it is nearly globose, and flattened at both poles. Basic color of skin, greenish-yellow but becomes orange-yellow when fully mature

dotted in a lighter shade; occasionally covered with a bluish-gray hue. Surface is more or less corrugated, sometimes irregularly broken. The bracts are very small, often hardly visible, olive-gray; all recessed. Skin is from 4-6 mm. thick with outside color entirely penetrating. Pulp white and firm. Blossom end depressed and irregular, divided into grooves.

*Seeds:* Color ranges from dark brown to black; kidney-shaped, slightly pitted; little less than 2 mm. long by 1.2 mm. wide.

### *Cereus peruvianus*

#### var. *reclinatus* Werdermann

(Plant No. 15 - 49, H. B. G.)

*Habit of growth:* Similar to var. *persicinus*, this variety is also low, spreading, branching densely from the base, thus indicating that it is perhaps an offspring of the spreading rather than of the upright type of *C. peruvianus*. Most branches extend part way in a horizontal direction, before turning upward. Some of the lowest ones trail along the ground and even strike roots in places of contact where favorable soil conditions are present. The spread of this variety is usually greater than its height. The largest specimen in the Huntington Botanical Gardens was planted about 25 years ago as a small plant (No. 15 - 49) and has attained a height of slightly over 2 m. (6 feet, 6 inches) while its spread, at base, is about 5 m. (16 feet).

*Color:* Of young growth, light green with bluish hue, fading into grayish-green when mature; often covered with lighter colored dots.

*Terminal:* In young growth, densely covered with almost black spines, ending in brown points which protrude from a short, grayish-white, felt-cushion. Mature limbs attain a thickness of 20 cm., tapering down to 7 cm. in young growth.

*Ribs:* Generally 7, occasionally 9; somewhat rounded. Very little difference in thickness between base and ridge, especially in young growth. In new growth, ribs are 25 mm. high and up to 40 mm. in old growth. Ridge, depending upon the age, ranges from 7 mm. - 15 mm. in thickness. Base of the ribs is often more than twice the thickness of the ridge in mature growth. Transverse lines often extend along the sides of the ribs two-thirds of the distance, beginning directly above the areoles. Indentations above the areoles divide the ridges into sections suggesting step-like notches.

*Areoles:* Slightly recessed, about 20 mm. apart in young growth, but in mature growth, aver-

age distance between areoles is slightly less than 20 mm. Occasionally, some areoles are farther apart. Nearly round, greatest transverse diameter in young growth is 8 mm., increasing somewhat in mature growth. All are covered with light gray felt when young, turning dark dusty-gray when mature.

*Spines:* In new growth, usually 6-7 radial spines about 5-8 mm. long. Evenly spaced along the edge of the areole. Generally only one central spine about 1 cm. long, sometimes slightly longer. Occasionally one or two additional, lighter-colored, central spines appear in the upper part of the areole. Color of spines in new growth, brownish-black. All are straight, stout, bulbous at the base. Their size, arrangement, and occasionally even the number, varies somewhat on different limbs.

All spines become dark on mature limbs and even blackish-gray on the oldest branches. Occasionally a few central spines are up to 30 mm. long.

*Flower:* Characteristic features of the flowers of this variety, marking them apart from the other members of the *peruvianus* group, are the recurved outside perianth segments, while the inside segments open in a bell-shaped fashion instead of wide open as is the habit of the species and the monstrose form. They are also slightly fragrant, about 22 cm. long with a comparatively slender tube which expands towards the top.

*Ovary:* About 24 mm. long with a transverse diameter of 18 mm., slightly corrugated, sometimes irregularly. Light green with a bluish hue in the grooves. Few, widely scattered, small bracts are found on the surface; about 15 mm. long, yellowish brown, ending in a lighter-colored fine point.

*Tube:* About 10 cm. long, slightly corrugated; light green, darker shade in the grooves. Scales not pointed, small at base, increasing to about 18 mm. in width near the top; green with brownish tinge.

*Outside perianth segments:* Considerably recurved up to 85 mm. long by 15 mm. wide; yellowish-green at base, reddish-brown near the apex.

*Inside perianth segments:* Up to 90 mm. long by about 15 mm. wide, acuminate. White, hairy fringe on apex 2-3 mm. long; margins serrated.

Average number of perianth segments, about 40.

*Stamens:* Attached to the tube beginning 50 mm. above the ovary. Light cream at base, fading to white above. Nectar cavity 50 mm. long.

*Anthems*: Yellowish, but becoming brown when wilted.

*Style*: (a) *Column*: About 13 cm. long; greenish-white. (b) *Stigma lobes*: About 17; 22 mm. long, greenish-yellow.

*Fruit*: While the fruit of this variety is almost typical, its average size is somewhat greater than that of the species and its monstrose form. About 50 - 70 mm. from stem to blossom end and 55 mm. in transverse diameter. A large proportion of this fruit tends to be more elongated than globose; shallow corrugations appear on the surface. Bracts located above shallow depressions are small, ending in a dark point. The color is yellow to orange-yellow when fully mature, occasionally a rosy tinge is perceptible at the base. Color penetrates skin almost through its entirety. Skin about 8 mm. thick. Pulp, white and rather firm. Blossom end is depressed and irregularly grooved. Fruit splits freely across the blossom end when mature.

*Seeds*: Almost black, somewhat kidney-shaped, slightly pitted; not quite 2 mm. long by about 1 mm. wide.

Daily flowering records were kept for this variety as well. The first period started May 18 and continued until July 10, during which time 1,673 flowers were produced. The daily flowering record for the second period is as follows:

July 16	—	11 flowers	July 29	—	34 flowers
17	—	18	30	—	28
18	—	14	31	—	46
19	—	31	Aug. 1	—	89
20	—	46	2	—	22
21	—	62	3	—	11
22	—	76	4	—	12
23	—	66	5	—	11
24	—	68	6	—	6
25	—	96	7	—	7
26	—	47	8	—	3
27	—	52	9	—	2
28	—	49	10	—	1
			11	—	0

TOTAL — 2,581 flowers

Total number of fruit produced was 746.

Other minor variations of *Cereus peruvianus* are of course found in Southern California and elsewhere (generally chance seedlings), but to recognize these unimportant differences would merely 'clutter up' botanical literature and add to the present confusion. However, I should like to bring one more, quite distinct, variety to the attention of the readers of this JOURNAL which, to the best of my knowledge, has not yet been published. The Huntington Botanical Gardens received two specimens of this variety in 1932 and a third in 1936, from a collection formerly housed in Washington, D.C., and used by the late N. R. Rose in preparing material for the monumental work by N. L. Britton and J. N. Rose, *The Cactaceae*.

### *Cereus peruvianus*

var. *ovicarpus* nov. var. Hertrich

(Type plant No. 42 - 53 - B, H. B. G.)

Ab C. peruviano typico fructu oviformi fere 65 mm. longo pelle polito et gilvo differt.

All indications at this time point to the fact that this variety grows very much more slowly than any of the foregoing varieties or, for that matter, than the species. Two small plants received in 1932 and a larger one obtained in 1936 were all acquired apparently from the same source, for all plants have the same Rose No. 12,609. They have been cultivated in the Huntington Botanical Gardens under different soil conditions and varying exposures, and yet none have attained a greater height than 38 cm. (15 inches).

*Habit of growth*: All plants branch from the base, and as far as can be determined at the present writing, form rather dwarf, bushy types. They appear to be as hardy as the other members of the *peruvianus* group.

*Color*: Body grayish-green, somewhat lighter in new growth.

*Ribs*: Usually 6, but sometimes one more, or occasionally one less; heavier than in the type but practically the same thickness along the ridge as at the base in new growth. In old growth, however, base becomes twice the thickness of the ridge. Nearly 30 mm. high in mature growth, slightly less in young; divided by sharp grooves. Ridge rounded; transverse lines, so prominent in other varieties along the sides of the ribs, are absent.

*Terminal*: Covered with brownish-black spines, protruding from a short, gray felt cushion.

*Areoles*: Less recessed than in the other members of this group. Nearly round, about 5 mm. in diameter; covered sparsely with light gray, short felt, becoming darker in age; about 20 mm. apart.

*Spine arrangement*: Somewhat longer than the type. Radial spines range from 5 - 7, usually 6. When only 5, upper one is missing, and the lower middle one is shorter than the two adjoining ones; uppermost one is usually the shortest. Three radial spines point downward, two sideward, and the balance in an upward direction. They range from 5 - 12 mm. in length. Only one central spine is usually present, from 15 mm. - 18 mm. long. All spines are bulbous at the base, grayish-black, acicular.

*Flower*: Length over all 16 cm.; somewhat fragrant.

*Ovary*: Light green with a slight bluish hue; 25 mm. long, 20 mm. in diameter on the outside. Yellowish-green triangular scales, 3 mm.

wide by 3 mm. long, terminating in a sharp point. Those nearer the base are narrower and longer, reddish-brown in color.

*Tube*: About 60 mm. long, yellowish-green, nearly smooth, slightly ribbed and grooved toward the top. Some of the ribs are extensions of the lower bracts. No scales on tube. Upper portion of the tube is slightly curved. Throat greenish-white.

*Outside perianth segments*: Up to 70 mm. long by 30 mm. wide, in the upper third; apex rounded, margins fringed. Some of the seg-

ments end in a sharp point, while others have a V-shaped cut 1 or 2 mm. deep.

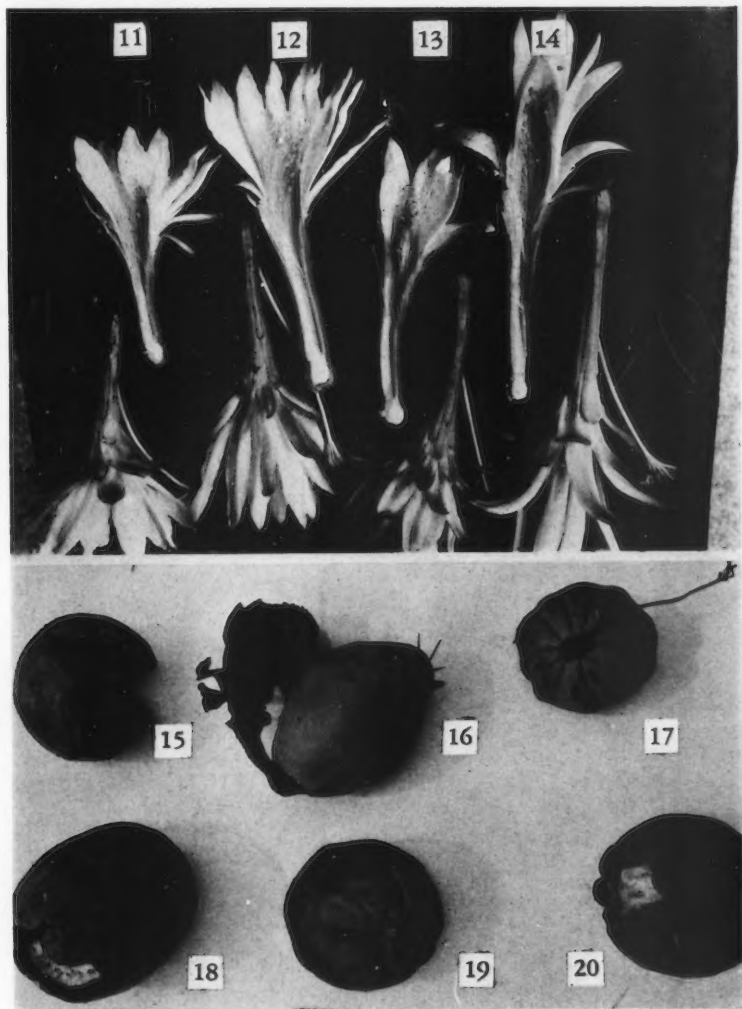
*Stamens*: Attached to the tube beginning about 40 mm. above the ovary; green at base, white above. Nectar cavity 40 mm. long.

*Anthers*: Light brown or tan; 3 mm. long.

*Style*: (a) *Column*: Approximately 10 cm. long, greenish-white, upper portion cream.

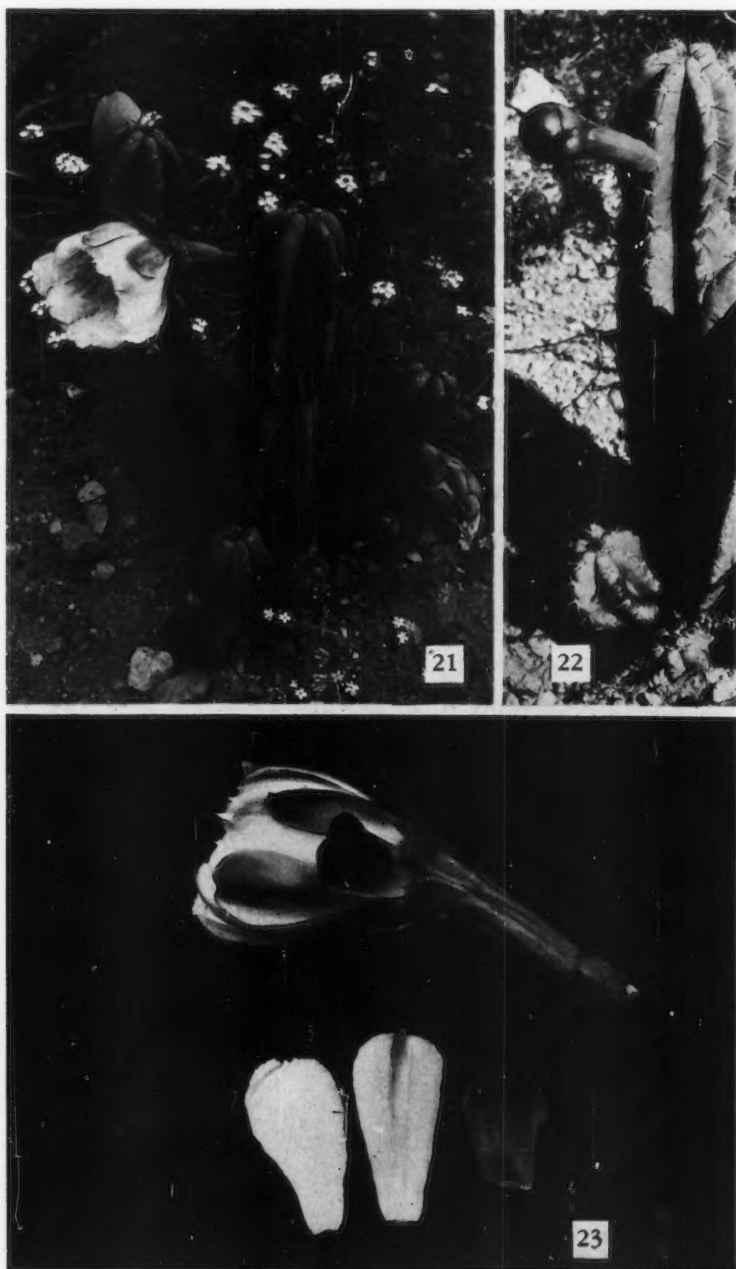
(b) *Stigma lobes*: 16; 20 mm. long, rather thin and slightly twisted; cream colored, extending even with the longest filaments.

*Fruit*: Ovate, 65 mm. long, 45 mm. in trans-



*Cereus peruvianus* flowers: 11. *C. peruvianus*, 12. var. *persicinus*, 13. var. *proferrens*, 14. var. *reclinatus*. Fruit: 15. *Cereus peruvianus*, 16. Rose plant. 17. f. *monstrosus*. 18. var. *reclinatus*, 19. var. *proferrens*, 20. var. *persicinus*.





21. Type plant of *Cereus peruvianus* var. *ovicarpus* nov. var. Hertrich.  
22. Showing bud. 23. Flower.

verse diameter. Pale yellow when mature, green at the stem end. Surface practically smooth, two or three short grooves near the blossom end, also a few dark brown, small pointed scales. Skin 6 mm. thick. Pulp white and firm. Blossom end very deep and irregular.

*Seeds:* Large, kidney shaped, dull black, nearly smooth, 2.5 mm. long by 1.5 mm. wide.

Following are the main characteristics which

mark var. *ovicarpus* apart from other members of the *peruvianus* group:

Dwarfed habit of growth, extremely heavy ribs and, contrary to the wide open flowers of the species, those of this variety open in a bell-shaped form. However, the most salient characteristic which accounts for the varietal name of *ovicarpus*, is the egg-shaped fruit, as well as its perfectly smooth skin, as against the heavily corrugated fruit of other varieties.



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(Right) Tree Aloe 34 feet high, photographed by Mr. W. Triebner in S. W. Africa.



*Kleinia pendula*, the "Inch-Worm." Photo by Mr. J. R. Brown in "Succulents for the Amateur."

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